

## IGNITION METHOD FOR A SOLID FUEL APPARATUS AND APPARATUS FOR CARRYING OUT SAID METHOD

### BACKGROUND

[0001] The invention relates to solid fuel apparatus, in particular to a horizontal or a vertical heating apparatus or a barbecue-type cooking apparatus, and most particularly to an ignition process or system for such a type of apparatus.

[0002] It is known that ignition (i.e., the initiation of combustion of fuel) of a solid fuel apparatus, in particular a heating apparatus or a barbecue-type cooking apparatus is responsible for the majority of accidents that occur with such apparatus.

### SUMMARY

[0003] To overcome these and other problems, while procuring other advantages, an ignition method for a solid fuel apparatus is provided. In particular, a heating apparatus or a barbecue-type cooking apparatus is provided. The method includes blowing hot air on at least one part of solid fuel, which is arranged in a container of the apparatus, in order to ignite combustion of the at least one part of solid fuel.

[0004] The combustion ignition by a hot stream of air may enable ignition without use of a fire lighting apparatus, such as, for example, matches, lighters and the like. The combustion by the hot stream of air also may enable ignition without use of various flammable products that include, more or less, toxic and dangerous liquid fuel type substances. The solid fuel can be, for example paper, small pieces of wood, wood coal, or any other solid fuel currently known or later developed.

[0005] In an exemplary embodiment, the method includes blowing hot air on the fuel, after initiating combustion of the at least one part of the solid fuel, in order to increase the time of combustion of the fuel, or to poke the fuel in the container.

[0006] By blowing hot air on the fuel, the time of initiating of combustion and of maintaining combustion may be increased to quickly obtain an efficient level of the apparatus and/or to poke the fuel to maintain or achieve a desired temperature and cooking speed.

[0007] The method according to the exemplary embodiments further includes blowing hot air on the solid fuel, before initiating combustion of the at least one part of the solid fuel, in order to remove moisture from the solid fuel.

[0008] In an exemplary embodiment, solid fuel apparatus, in particular a heating apparatus or barbecue-type cooking apparatus, may include a container for containing a solid

fuel. The apparatus may also include at least one means for generating a hot air stream on at least one part of the solid fuel.

[0009] The container may have a furnace grid and an ash pit disposed under the furnace grid. The furnace grid and the ash pit may be disposed in a bottom of the container. The means for generating the hot air stream on the at least one part of the solid fuel may include a pipe and a hot air stream generator. The pipe may conduct the hot air stream to the container. A first end of the pipe may lead to the grid into the container, or over to the grid. The hot air stream generator may be disposed outside of the container and may be connected to a second end of the pipe.

[0010] The pipe that may conduct the hot air stream to the container may have a hot air providing means to provide hot air to the ash pit. The first end of the pipe may lead to the grid into the container, or over the grid, and the second end may be connected to the hot air stream generator.

[0011] Providing hot air to the ash pit may enable diffusion of the hot air below the furnace grid and may widely distribute the hot air through the furnace grid to the fuel situated in the container and over the furnace grid. Thus, the hot air diffusion points into the fuel can be distributed along a wider area.

[0012] The apparatus may further include shutting means to obstruct the feeding of hot air to the ash pit. The shutting means may be movable between a plurality of positions, a first position where the shutting means is open, providing hot air to the fuel, a second position where the shutting means is closed, preventing or discouraging hot air being fed to the fuel, and a third position where the shutting means is partially open.

[0013] This characteristic enables the user to choose a hot air distribution according to his needs.

[0014] The apparatus may further have a regulation means for regulating the hot air stream headed through the pipe.

[0015] This characteristic enables an user to modify the hot air stream exhausted to the fuel according to his needs.

[0016] The apparatus may further have a means for diffusion of the hot air stream in a horizontal plane and radially into the container.

[0017] This characteristic enables distribution and an extended period of time of providing the hot air to or into the fuel, and thus enables a better efficiency of the hot air ignition system.

**[0018]** The pipe may further include a first end connected to an air stream generator, in which the pipe has several sleeves of different diameters, having one or several entries. One or several fans equipped with heating resistance may be adapted, respectively, to the one or several entries of the pipe by a rapid-junction means.

**[0019]** This characteristic enables connection by a simple sleeve, or by any other known or later developed quick connecting systems, one or several fans equipped with heating resistance to the pipe. The one or several fans equipped with heating resistance may include, for example, fans available on the market, such as a "hair-dryer" or a "burner" among others, which are able to be removed once the ignition operation is ended, or which may stay connected for further activating embers of the solid fuel by providing oxygen, in order to raise the furnace temperature, for example.

**[0020]** The pipe may further be connected to the apparatus by drilling, for example, at least one hole, in the bottom of the ash pit. The pipe may be quickly fitted by way of thread, lug, quarter turn milled ring, or by any rapid-junction means at the at least one hole in the bottom of the ash pit.

**[0021]** This characteristic enables the pipe to be adapted onto an existing solid fuel apparatus, in order to provide such an apparatus with an ignition system, as described above.

**[0022]** The pipe may be inserted into the ash pit until the pipe brushes against the furnace grid of the apparatus.

**[0023]** The pipe may be fitted onto the ash pit by the rapid-junction means, enabling a quick removal of the pipe in order to, for example, empty the ash pit.

**[0024]** The pipe may have oblique holes drilled along the pipe's upper surround, in order to widely diffuse the hot air stream. A hot air stream division caused by, for example, a truncated washer arranged inside the pipe, may assure the division of the hot stream for one side towards the ash pit and for the other side towards the container in which the furnace of the apparatus is set.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

**[0025]** Other characteristics will appear more clearly by reading the following exemplary embodiments of a barbecue-type cooking apparatus, with reference to the appended drawings, examples given as illustration without any limitation.

**[0026]** Figure 1 shows a cross-sectional view in a first embodiment of a barbecue-type cooking apparatus according to the invention;

[0027] Figure 2 shows a partial cross-sectional view of a second embodiment of a barbecue-type cooking apparatus according to the invention; and

[0028] Figure 3 shows an enlarged detailed depiction of the apparatus shown in figure 1.

#### DETAILED DESCRIPTION OF EMBODIMENTS

[0029] With reference to figures 1 and 2, a container 6 surrounded by a frame 7 has a cooking grid 8. The cooking grid 8 may be adjustably fixed in the frame 7, relative to a bottom of the container 6. A furnace grid 9, may be disposed at the bottom of the container 6. An ash pit 10 may be disposed under the furnace grid 9. A pipe 1, for leading a hot air stream into the container 6, has a first end that leads to the furnace grid 9 into the container 6, or over the container 6. A hot air stream generator 3, 4, 5 disposed outside of the container 6, and connected to a second end of the pipe 1, is capable of providing heated air, preferably to a temperature around 500°C, for example, by way of electrical resistors. Legs 11 may support the container 6.

[0030] The hot air stream, channeled into the pipe 1 having a shape and section adapted to the ash pit 10, is advantageously regulated by rotation of a throttle 2 which is disposed to modify the flow of the hot air stream at will. The exhausted air is, for example, furnished by a hand held fan 4 or electrical fan 5. The hot stream generator has one or multiple gears, provided with one or several electrical resistors at its outing, and is preferably controlled by a switch, remote control or any other equivalent control apparatus. This hot stream generator advantageously enables quick moisture removal from the solid fuel before initiation of combustion, which may advantageously be automatic. The hot stream generator may then poke embers of the solid fuel if needed, according to the temperature and/or the desired cooking speed, and/or other parameter.

[0031] The pipe 1 is advantageously provided with a set of sleeves 12 of different diameters, with one or several entries, enabling by a sleeve, or by any other known or later developed quick connecting system connection to one or several fans equipped with heating resistance, for example, of the type available on the market, such as a "hair-dryer" or a "burner" among others. The fans may be removed from the hot stream generator after the ignition operation begins, or may remain connected for activating embers or introducing additional oxygen, in order to raise the furnace temperature, for example.

[0032] The pipe 1, which may or may not be provided with a flow regulating throttle 2, is adaptable onto many or most of currently known barbecues by simply drilling a

bottom of the ash pit 10, and quickly fitting the flow regulating throttle 2 by way of thread, lug, quarter turn milled ring, or any rapid-connecting means. The pipe 1 may be inserted, for example, into the ash pit 10 until it brushes against the furnace grid 9, as shown on figures 1 and 2, in order to avoid ash dispersal by the exhaust stream. The pipe 1 may easily be removed to be emptied. The pipe 1 is advantageously drilled by oblique holes 14 along its upper surround, in order to diffuse the air coming into the furnace. For example, the air may be diffused by way of a hot air stream division, such as, for example, an air stream division caused by a truncated washer 13 disposed across the pipe 1. The truncated washer may be as wide as possible to fit inside the pipe 1.

[0033] According to the exemplary embodiment of figure 3, the pipe 1 may be inserted directly into the container 6, over the furnace grid 9, the second pipe end being connected to the hot air stream generator 3, 4, 5 thus feeding the ash pit with hot air. The first end of the pipe 1 inserted into the container 6, may be advantageously fitted with a mobile diffuser 15 (as shown in Fig. 2) to obstruct or encourage the feeding of hot air into the ash pit 10, depending on the position chosen by a user, for example by a simple rotation of the diffuser 15. The diffuser 15 may be a cap, turn fitted onto the end of the pipe 1, may have drilled holes appropriated to diffuse hot air, hooding the end of the pipe 1. The drilled holes of the diffuser 15 may be disposed in order to advantageously enabling the diffusion of the hot air stream in a horizontal plane and radially into the container 6 more advantageously into the ash pit 10.

[0034] The diffuser 15 may be removable and may have an upper part 16. When inserted into the furnace, the upper part 16, being flat or convex, may diffuse all or a part of the hot air stream in a horizontal plane into the container 6 and, depending on user needs, into the upper part of the ash pit 10.

[0035] The pipe 1 is advantageously fitted onto the ash pit 10 by any rapid-junction means known or later developed, such as, for example, a sleeve, enabling a quick removal, of the pipe 1, in order to enable emptying of the ash pit 10.

[0036] The invention enables ignition of a barbecue without matches or a lighter, in less than one minute, with a hot air stream at a temperature of around 500°C and to increase the spreading of combustion. Cooking can begin three minutes after ignition. Moist fuel may be utilized because the moisture may be removed in seconds by the exhausted hot air. The cooking time can be accelerated by feeding the container 6 with hot air as discussed above or by stopping the feeding of hot air. If the apparatus does not include an ash pit, the hot air may

be introduced directly into the container. Alternatively, the hot air stream generator can be provided with a gas burner and be exhausted by a hand held fan.

[0037] The exemplary apparatus may also be applicable to inserts, wood or coal burning stoves, chimney or any other heating or cooking means using solid fuel wood, coal, waste oil based materials, or the like.